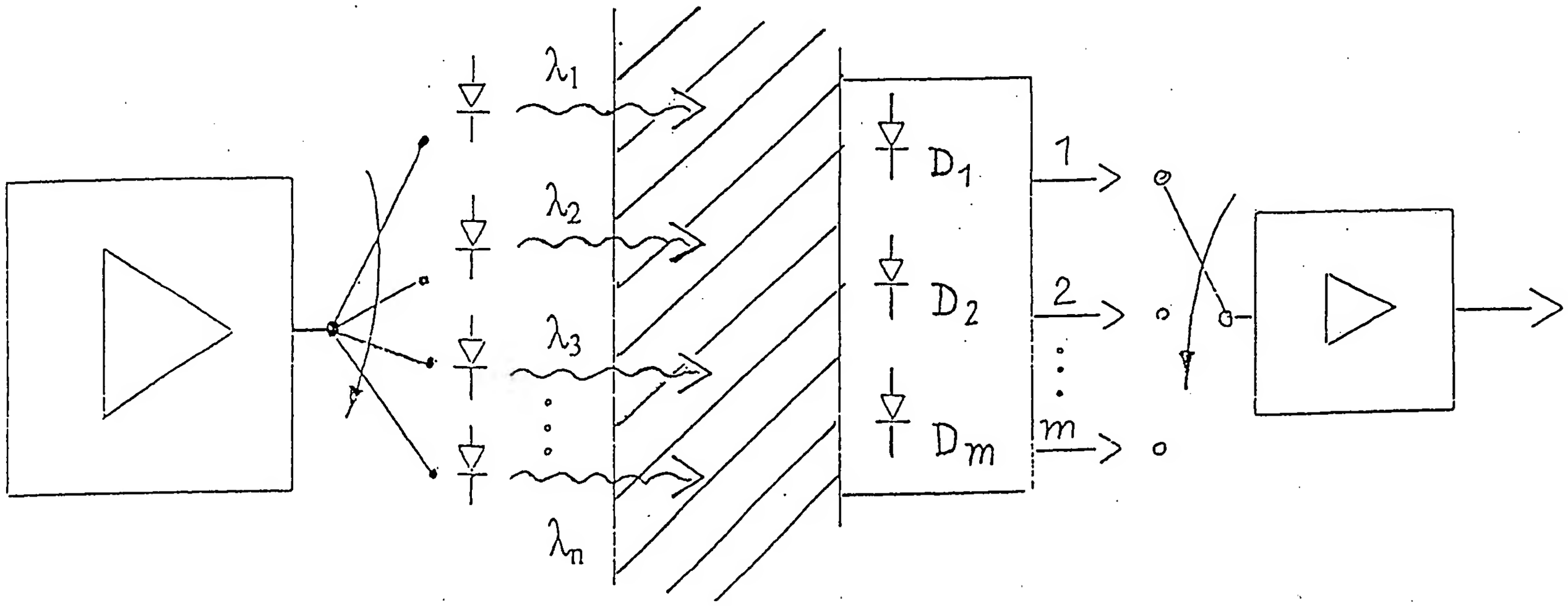
Multiplexer

Demultiplexer



Emission Control

n Emitters

m Photoelectric Transducers

Signal Processing

FIG. 1

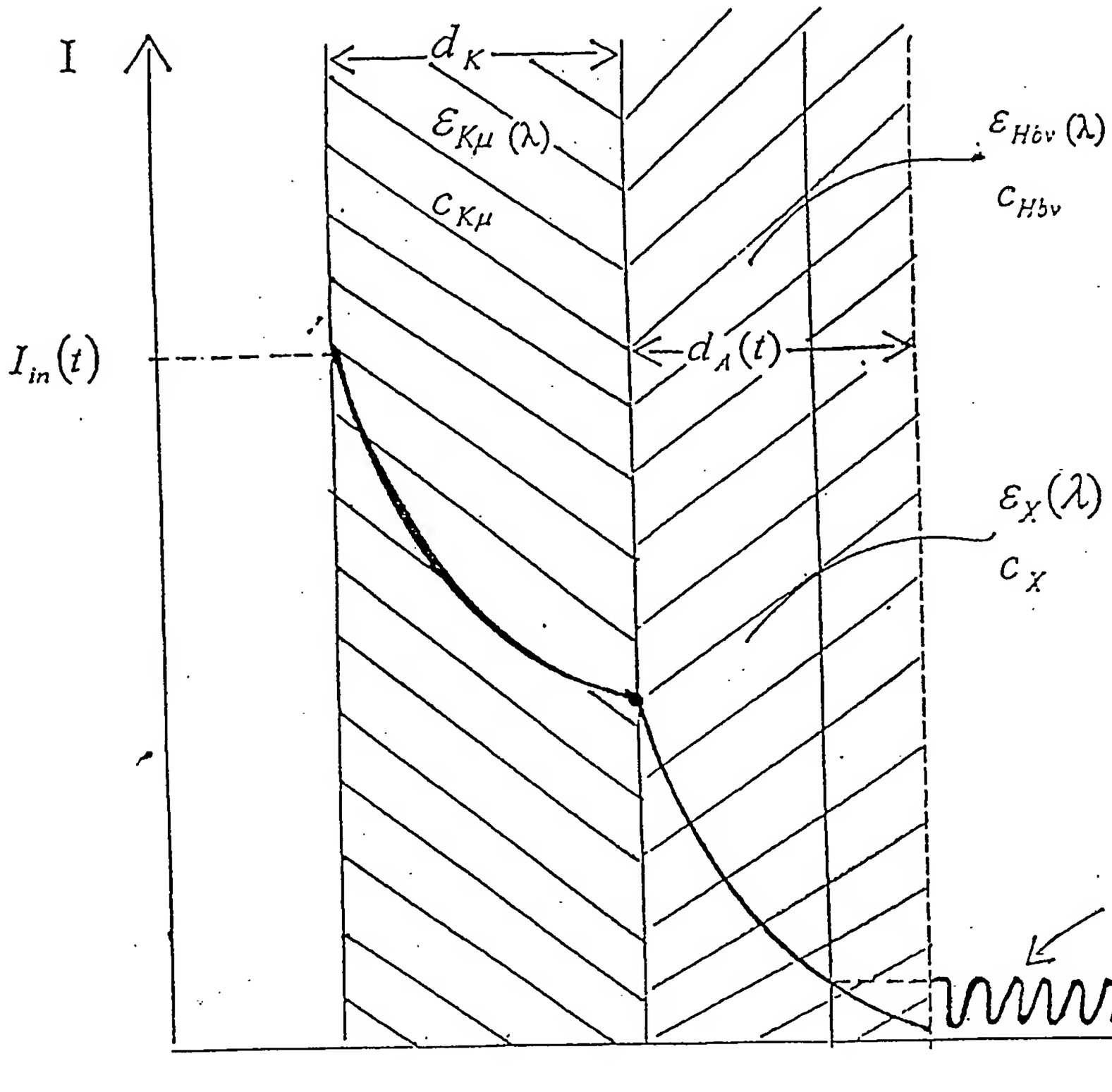

I
d_K
$\varepsilon_{K\mu}(\lambda)$
$c_{K\mu}$
$\varepsilon_{H\acute{o}v}(\lambda)$
$c_{H\acute{o}v}$
$I_{in}(t)$
$d_A(t)$
$\varepsilon_X(\lambda)$
c_X
$I_{out}(t)$
d
Constant
Tissue
Pulsatile
(arterial)
Blood Compartment

FIG. 2

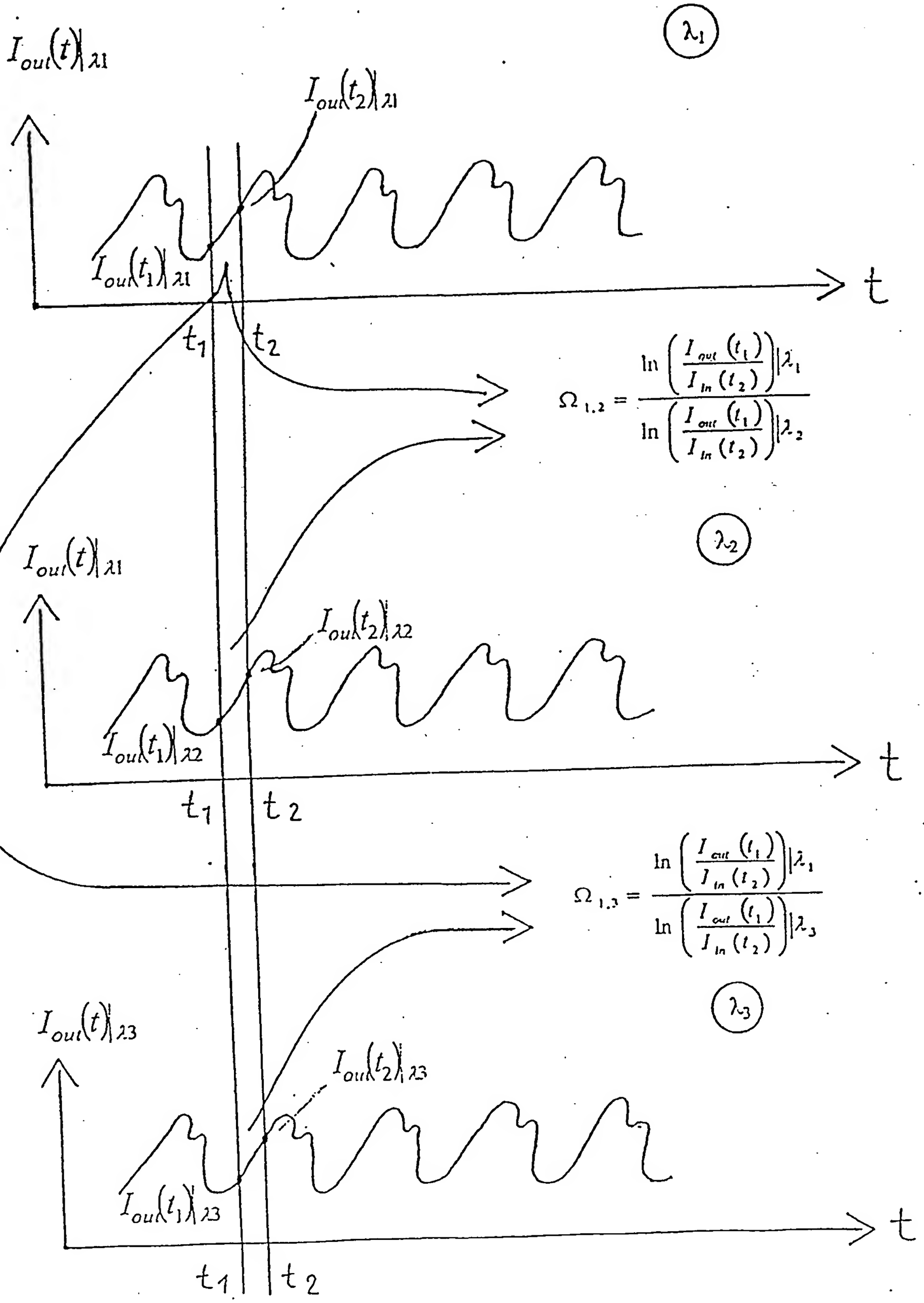

λ1
$I_{out}(t)|_{\lambda 1}$
$I_{out}(t_2)|_{\lambda 1}$
$I_{out}(t_1)|_{\lambda 1}$
t
t_1
t_2
$\Omega_{1,2} = \frac{\ln\left(\frac{I_{out}(t_1)}{I_{in}(t_2)}\right)|_{\lambda_1}}{\ln\left(\frac{I_{out}(t_1)}{I_{in}(t_2)}\right)|_{\lambda_2}}$
λ2
$I_{out}(t)|_{\lambda 1}$
$I_{out}(t_2)|_{\lambda 2}$
$I_{out}(t_1)|_{\lambda 2}$
t
t_1
t_2
$\Omega_{1,3} = \frac{\ln\left(\frac{I_{out}(t_1)}{I_{in}(t_2)}\right)|_{\lambda_1}}{\ln\left(\frac{I_{out}(t_1)}{I_{in}(t_2)}\right)|_{\lambda_3}}$
λ3
$I_{out}(t)|_{\lambda 3}$
$I_{out}(t_2)|_{\lambda 3}$
$I_{out}(t_1)|_{\lambda 3}$
t
t_1
t_2

FIG. 3

Determination of C_{Hb}

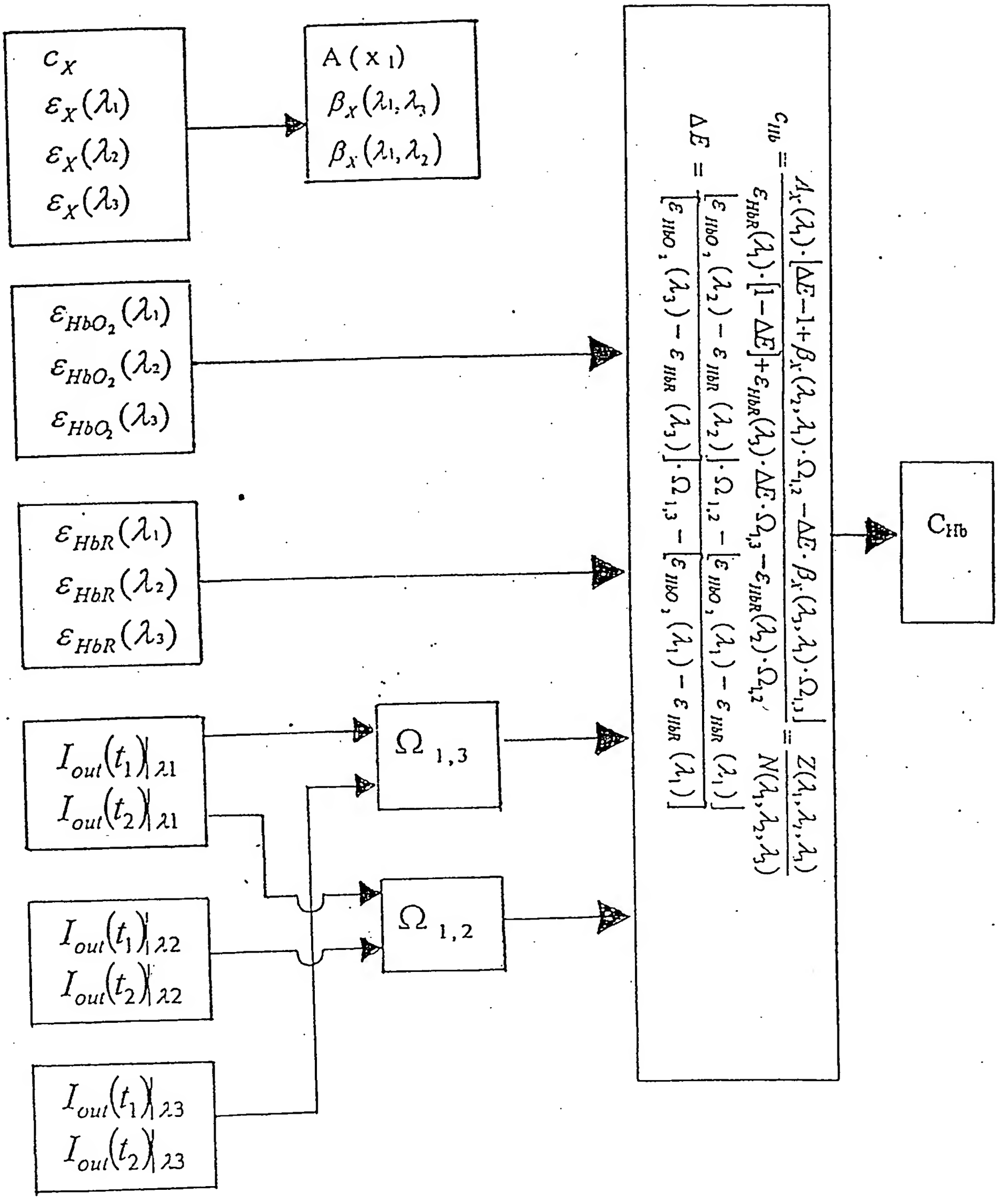
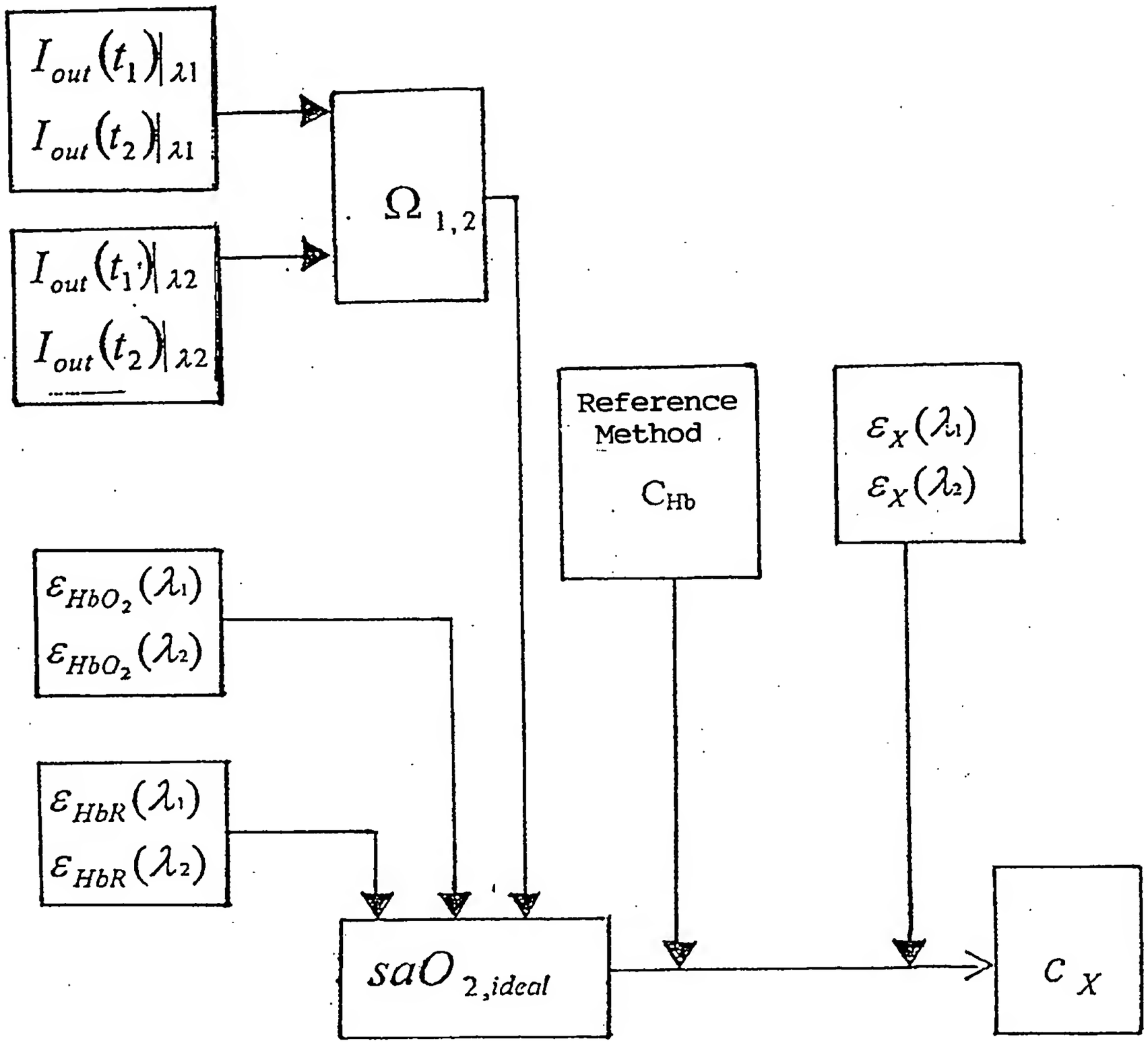


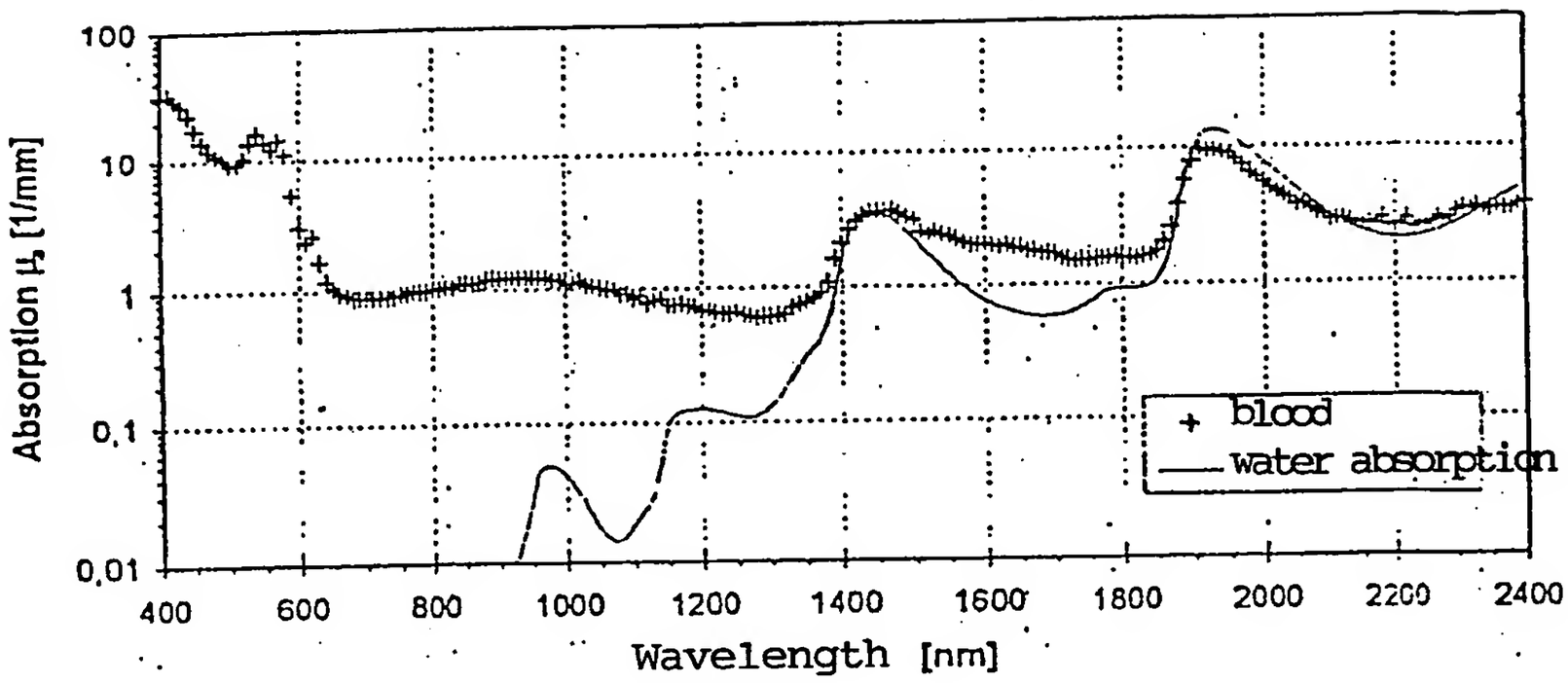
FIG. 4

Determination of von C_x



Cx: z. B.: Bilirubin
Evans-Blue

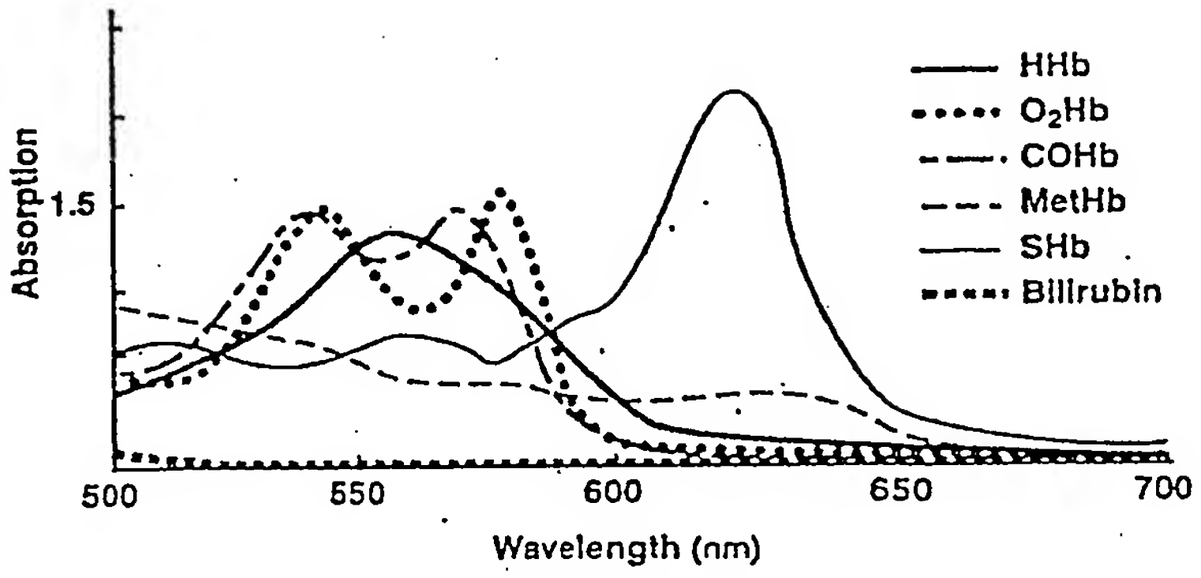
FIG. 5



Spectral Absorption of Blood for $saO_2 \sim 98$ [%]; Hct = 44 [%]
pH = 7.4; π = 0,3 [Osm]; d = 67 [µm]. cf. H_2O-Absorption.

FIG. 6

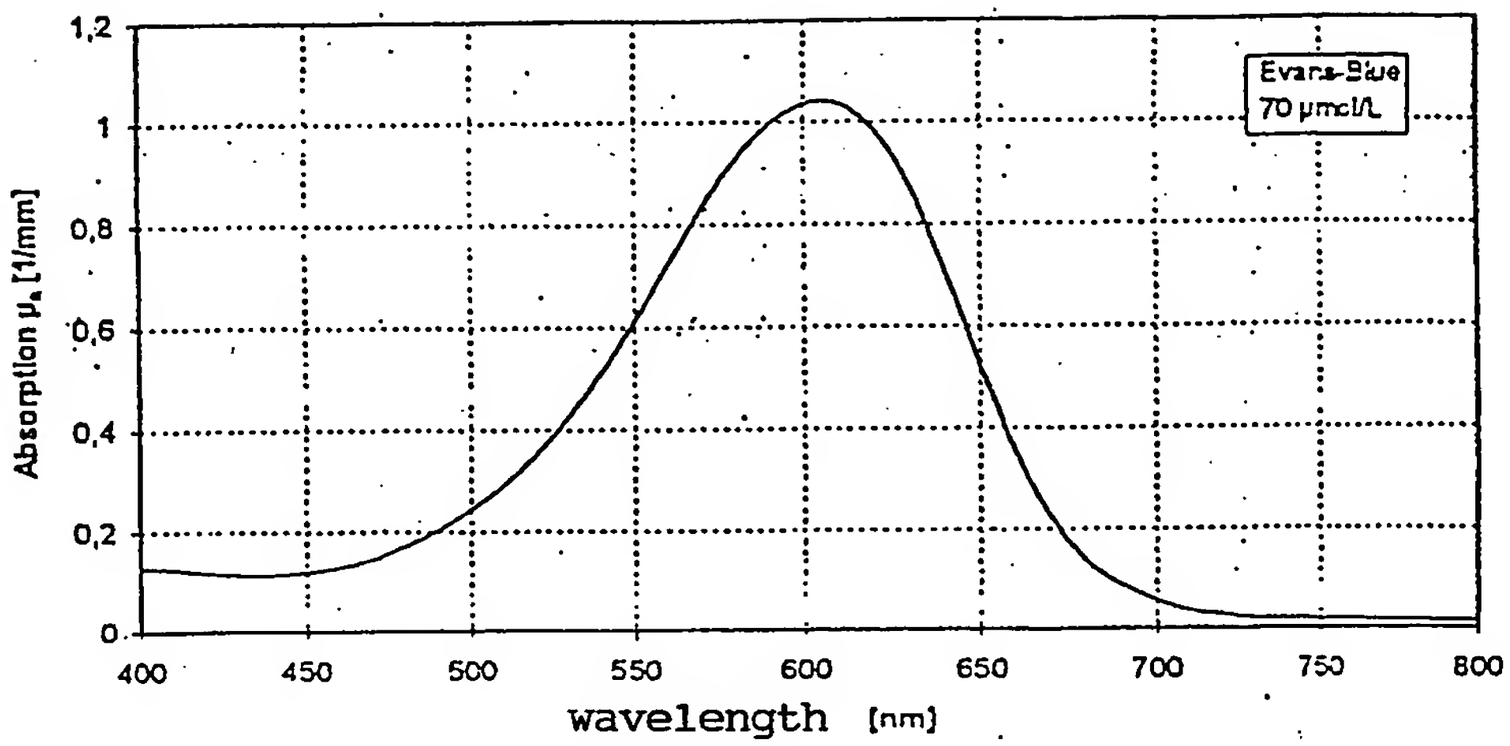
Source: Roggan, A.: Dosimetry of Thermal Laser Applications in Medicine; ecomed 1997



Spectral Absorption of Hb Derivatives: Functional and Dysfunctional Hb Derivatives

FIG. 7

Source: Holbek, C.: New Developments in the Measurement of Co-Oximetry. Anesth Analg; 94: pp. 89-92



Spectral Absorption of CLinical Marker Substance Evans Blue. Aqueous Solution $C_{EB} = 70$ [µmol/l].

FIG. 8

Source: Roggan, A.: Dosimetry of Thermal Laser Applications in Medicine; ecomed 1997

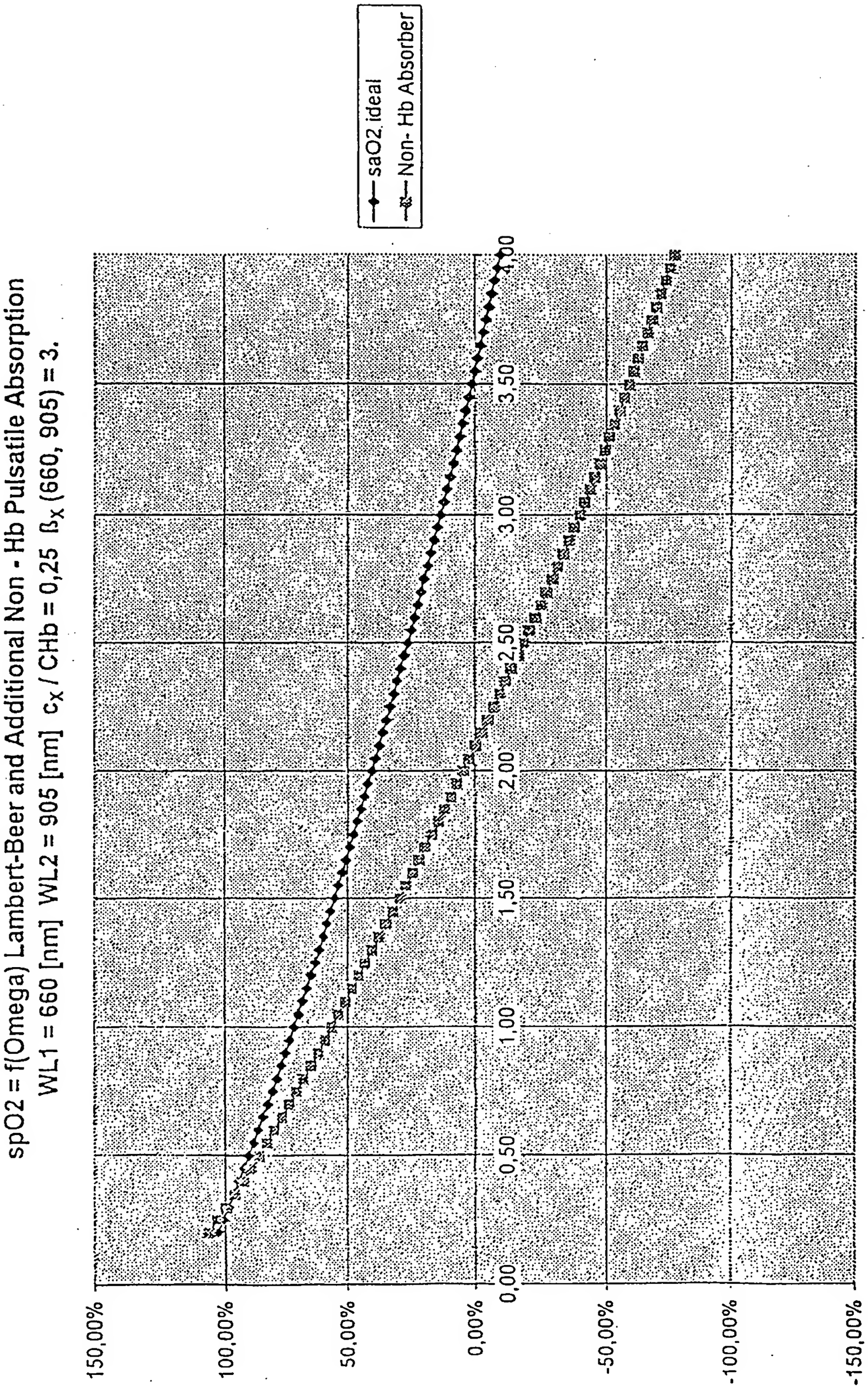

spO2 = f(Omega) Lambert-Beer and Additional Non - Hb Pulsatile Absorption
WL1 = 660 [nm] WL2 = 905 [nm] cx / CHb = 0,25 βx (660, 905) = 3,
saO2 ideal
Non- Hb Absorber
Calibration Curve spO2 / [%]
150,00%
100,00%
50,00%
0,00%
-50,00%
-100,00%
-150,00%
0,00
0,50
1,00
1,50
2,00
2,50
3,00
3,50
4,00
Omega

FIG. 9